



KENNEBEC

Community Church

20 Saint Andrews Street, Augusta, Maine

Application Packet for Parking Lot Expansion



Prepared by:
Steve Roberge
SJR Engineering Inc.
21 Mayflower Road
Augusta, Maine 04330
Tel/Fax: 1-207-622-1676

May 13, 2016

City of Augusta
Development Review Application
 Bureau of Planning, Department of Development Services

Address of Proposed development: Saint Andrews Street

Zone(s): RA (Low Density Residential District)

Project Name: Parking Lot Expansion for Kennebec Community Church

Existing Building (sq. ft.): 1970 ±

Proposed Building (sq. ft.): none proposed

Existing Impervious (sq. ft.): 1970 ±

Proposed Impervious (sq. ft.): 29,187 sf

Structure Demolition: No

Blasting Proposed (cu. ft.):: not anticipated

Proposed Total Disturbed Area of the Site: 42,255 sf

Proposed disturbance of greater than one acre requires a Chapter 500, Stormwater Management Permit from the Maine Department of Environmental Protection (DEP).

Owner's Name/Address:

Kennebec Community Church
 20 St Andrews St.
 Augusta, Maine 04330

Phone #: 207-623-0911

Cell #:

e-mail:

office@kennebecchurch.org

Applicant's Name/Address:

Colin Miller
 Kennebec Community Church
 20 St Andrews St.
 Augusta, Maine

Phone #: 207-623-0911

Cell #: 207-620-0579

e-mail:

office@kennebecchurch.org,
colin_miller@hughes.net

Consultant's Name/Address:

Steve Roberge
 SJR Engineering Inc.
 21 Mayflower Road
 Augusta, Maine 04330

Phone #: 207-622-1676

Cell #: 207-242-6248

e-mail: steve@sjreng.com

Tax Map #: 10

Lot #: 19A

Lot Size (acres):

10.86

Frontage (Feet):

575

Form for Evidence of Standing

Deed attached

Signatures:

Applicant:



Date:

5/13/16

Owner:

Kennebec Community Church

Date:

5/13/16

Agent:

STEVE ROBERGE, SJR ENGINEERING INC

Date:

5-13-2016

For Staff Use

Fee Calculation: Major Development max fee is \$4,000; Minor Development max fee is \$1,000

Major Development: $\$2,000 + (\text{number of sq ft over } 25,000 \times \$0.15) =$

Minor Development: $\$250 + (\text{number of sq ft over } 5,000 \times \$0.15) =$

All Development: $\text{Number of Abutters} \times (\text{1oz First Class postage fee} + \$0.15) =$

Total Fee:

Checklist. The checklist below must be completed by the applicant. The required material or a written waiver request must be provided.

Information Required on Plan(s) See Augusta Land Use Ordinance for greater detail including Section 300-405B(1) Preliminary Plan Requirements and Section 300-305B Final Plan Requirements	Included	Waiver Requested
a. Name of Site Plan or Subdivision. 300-405B(1)(a)	☑	
b. Owner(s) name and address. 300-405B(1)(b)	☑	
c. Deed reference to subject parcel and immediate abutter identification. 300-405B(1)(c)	☑	
d. Engineer's name, address, signature and seal. 300-405B(1)(d)	☑	
e. Surveyor's name, address, signature and seal. 300-405B(1)(e)		☑
f. Scale, both in graphic and written form. 300-405B(1)(f)	☑	
g. Date and revision box. 300-405B(1)(g)	☑	
h. Zoning designation(s). 300-405B(1)(h)	☑	
i. North Arrow (true, magnetic, dated or grid). 300-405B(1)(i)	☑	
j. Preliminary site plan. 300-405B(1)(j)	☑	
k. Ownership, location & present or proposed use of abutting properties. 300-405B(1)(k)	☑	
l. Location map. 300-405B(1)(l)	☑	
m. Streets, existing & proposed, with curve data. 300-405B(1)(m) & 300-406B(5)	NA	
n. Drainage and erosion control. 300-405B(1)(n)	☑	
o. Utilities, existing and proposed. 300-405B(1)(o)	☑	
p. Topography, 2 foot contours. 300-405B(1)(p)	☑	
q. Lot lines and dimensions. 300-405B(1)(q)	☑	
r. Proposed use of the property. 300-405B(1)(r)	☑	
s. Proposed public or common areas, if any. 300-405B(1)(s)	NA	

t. Boundary survey and associated information. 300-405B(1)(t)		<input checked="" type="checkbox"/>
u. Traffic controls, off-street parking and facilities. 300-405B(1)(u)	<input checked="" type="checkbox"/>	
v. Proposed fire protection plans or needs. 300-405B(1)(v)	NA	
w. Landscaping and buffering. 300-405B(1)(w)	<input checked="" type="checkbox"/>	
x. Outdoor lighting plan. 300-405B(1)(x)	NA	
y. Freshwater wetlands. 300-404B(15)	NA	
z. River, stream or brook. 300-404B(16)	NA	

Information Required in Written Project Narrative See Augusta Land Use Ordinance for greater detail Section 300-404B(1) Criteria for Reviewing the Preapplication and Section 300-603E Conditional Uses Site Plan Review Criteria	Included	Waiver Requested
1. Pollution – undue water or air pollution. 300-404B(1) We have designed this project to not contribute to undue water or air pollution. The parking lot will be stabilized and protected from erosion by standard erosion control devices. Water runoff will be controlled by a detention pond to limit discharges to pre-existing conditions.	<input checked="" type="checkbox"/>	
2. Water – sufficient potable water. 300-404B(2) While there is public water available at the site, the project does not anticipate using this resource for its construction.	<input checked="" type="checkbox"/>	
3. Municipal Water – adequate supply, if applicable. 300-404B(3) While there is public water available at the site, the project does not anticipate using this resource for its construction.	<input checked="" type="checkbox"/>	
4. Soil Erosion – unreasonable soil erosion. 300-404B(4) An erosion control plan and narrative has been prepared for the construction project. In addition, the Contractor will be required to supplement/install any needed erosion control devices that are required for the protection of erosion/sedimentation within the project site. The proposed project will not cause unreasonable soil erosion or a reduction in the land's capacity to hold water so that a dangerous or unhealthy condition results.	<input checked="" type="checkbox"/>	
5. Road congestion and safety. 300-404B(5) & 300-405B(1)(v) The parking lot expansion is designed to help alleviate vehicle parking concerns during significant Church events. Off street parking will be enhanced with this proposal. The proposed project will not cause unreasonable highway or public road congestion or unsafe conditions with respect to the use of the highways or public roads existing or proposed.	<input checked="" type="checkbox"/>	

6. Major Developments, additional traffic movement. 300-404B(6) Not applicable...this project does not meet the criteria for a major development.	<input checked="" type="checkbox"/>	
7. Sewage waste disposal – adequate provisions. 300-404B(7) While there is public sewer available at the site, the project does not anticipate using this resource for its construction.	<input checked="" type="checkbox"/>	
8. Solid waste – adequate provisions. 300-404B(8) The project does not anticipate generating solid waste during construction. Excess excavation materials will be the contractor responsibility for disposal (Fill site likely) The proposed project will not cause an unreasonable burden on the municipality's ability to dispose of solid waste	<input checked="" type="checkbox"/>	
9. Aesthetic, cultural, and natural values. 300-404B(9) A portion of site has been recently cleared of tree growth where the project is to be located. Areas surrounding the project disturbed area are currently wooded and undeveloped. There are no known cultural artifacts located within the property. An abutting property to this project has a dedicated area for natural resource viewing (Augusta Nature Club). The proposed project will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites, significant wildlife habitat identified by the Maine Department of Inland Fisheries and Wildlife or the City of Augusta, or rare and irreplaceable natural areas.	<input checked="" type="checkbox"/>	
10. Conformity with City ordinances and plans. 300-404B(10) We believe we have designed the parking lot expansion in conformance with City ordinances, comprehensive plan, and development plans.	<input checked="" type="checkbox"/>	
11. Financial and technical capacity. 300-404B(11) Kennebec Community Church will self-finance the project. SJR Engineering has been retained to prepare plans and specifications for the parking lot expansion. The Owner has adequate financial and technical ability to develop the project in a manner consistent with state and local performance, environmental, and technical standards.	<input checked="" type="checkbox"/>	
12. Surface water, shorelands and outstanding rivers. 300-404B(12) The parcel does not have any shoreland or outstanding river segments. Surface water flows across the proposed parking area in the same direction as it currently does. A detention pond is to be constructed that will mitigate any increases in runoff flow rates.	<input checked="" type="checkbox"/>	
13. Groundwater – negative impact. 300-404B(13) The construction of the parking lot expansion is not expected to impact any groundwater flows. No use of the groundwater is anticipated with the project. The proposed project will not, alone or in conjunction with existing activities, adversely affect the quantity of groundwater.	<input checked="" type="checkbox"/>	

<p>14. Flood areas. 300-404B(14)</p> <p>The project does not lie within a 100 year flood plain as depicted in the Federal Emergency Management Agency's Flood Boundary and Floodway Maps and Flood Insurance Rate Maps.</p>	<input checked="" type="checkbox"/>	
<p>15. Freshwater wetlands – description of impact. 300-404B(15)</p> <p>No wetlands have been identified with the proposed project.</p>	<input checked="" type="checkbox"/>	
<p>16. River, stream or brook – description of impact. 300-404B(16)</p> <p>No river, stream, or brooks have been identified within the proposed project area.</p>	<input checked="" type="checkbox"/>	
<p>17. Stormwater – management plans. 300-404B(17)</p> <p>A storm water management plan has been prepared by SJR Engineering for the project. The narrative of the study has been included with the application materials. A detention pond is proposed to control runoff peak rates. The proposed project will provide for adequate stormwater management.</p>	<input checked="" type="checkbox"/>	
<p>18. Access to direct sunlight. 300-404B(18)</p> <p>The construction of the parking lot expansion will have no impact for access to direct sunlight.</p>	<input checked="" type="checkbox"/>	
<p>19. State permits – description of requirements. 300-404B(19)</p> <p>No additional permits for the project are necessary other than City of Augusta Planning Board approval. The existing facility was constructed prior to DEP existence and is considered a grandfathered use. Impervious areas prior to the formation of DEP are not counted towards current DEP criteria. The proposed project is too small (ie less than 1 acre disturbed site) to require a DEP permit.</p>	<input checked="" type="checkbox"/>	
<p>20. Spaghetti lots prohibited – 300-404B(20)</p> <p>Not applicable...No lots are being divided.</p>	<input checked="" type="checkbox"/>	
<p>21. Outdoor lighting – description of lighting plans. 300-404B(21)</p> <p>The owner may choose to install outdoor lighting at some point in the future. He is planning to install conduit under the new parking expansion to run underground electricity to a lamp post base that would be located at each end of the landscape strips dividing the proposed parking cells. The lighting type/style/height has an impact on lighted area. The Owner will submit a luminaire study to codes enforcement prior to installation of the lighting to show no stray lighting encroaches onto abutting properties, and that the light is shielded to cast light in a downward manner only.</p>	<input checked="" type="checkbox"/>	
<p>22. Neighborhood compatibility – description per ordinance. 300-603E(1)</p> <p>The parking lot expansion is designed to conform to the land use ordinance. It is to be sited adjacent to the existing parking lot with landscaping features between parking lot cells that were not part of the original existing parking lot. Existing wooded perimeter will be retained as well as a 6' tall earth berm along the former Saint Andrews Street ROW to Cony High School athletic fields. No buildings are being proposed. The parking lot expansion is a needed accessory use for the existing church building function.</p>	<input checked="" type="checkbox"/>	

<p>23. Compliance with plans and policies. 300-603E(2)</p> <p>SJR Engineering believes the design of the project is in compliance with the land use ordinance and City of Augusta policies. It is assumed the proposed parking expansion is in accordance with the adopted elements of the 1988 Growth Management Plan. No buildings are being proposed. The parking lot expansion is a needed accessory use for the existing church building function.</p>	<input checked="" type="checkbox"/>	
<p>24. Traffic pattern, flow and volume analysis. 300-603E(3)</p> <p>No new traffic pattern is proposed with this proposal. Traffic will still traverse Saint Andrews Street and enter through the existing parking lot, even to gain access to the expanded parking area. The new parking lot will provide for the smooth and convenient movement of vehicles both on and off the site. No flow or volume analysis has been performed for the parking lot expansion. There is no proposed building or building expansion contemplated at this time.</p>	<input checked="" type="checkbox"/>	
<p>25. Public facilities – utilities including stormwater. 300-603E(4)</p> <p>No utilities are expected to be utilized with the parking lot expansion. A detention pond has been proposed within the parcel that will discharge the same peak flow rates (swale) as the existing undeveloped condition. A pipe outlet from the pond is proposed that would run underground of the street ROW and be discharged into a plunge pool erosion control devise.</p>	<input checked="" type="checkbox"/>	
<p>26. Resource protection and the environment. 300-603E(5)</p> <p>The existing site where the parking facility is to be constructed has been cleared of trees. No environmental resources are evident in the area of the proposed expansion. The parking lot</p>	<input checked="" type="checkbox"/>	
<p>26. Performance standards. 300-603E(6)</p> <p>The visual integrity of the proposed expanded parking facility will be more desirable than the existing facility. It has been designed with landscape islands between parking stall cells to help blend the project into the surrounding existing wooded landscape of the parcel.</p>	<input checked="" type="checkbox"/>	
<p>28. Financial and technical ability. 300-603E(7)</p> <p>Kennebec Community Church will self-finance the project. SJR Engineering has been retained to prepare plans and specifications for the parking lot expansion.</p>	<input checked="" type="checkbox"/>	

Application Materials

The application materials that are required for a complete application are listed below:

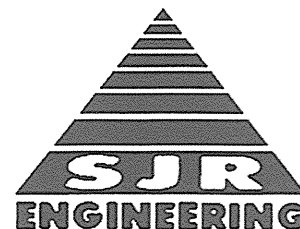
Paper Copies	Included	Waiver Requested
10 copies of the Application Packet	<input checked="" type="checkbox"/>	
- Application Form(s)	<input checked="" type="checkbox"/>	
- Project narratives	<input checked="" type="checkbox"/>	
- Purchase & sale agreement, or other document to show standing	<input checked="" type="checkbox"/>	
- Letter authorizing the agent to represent the applicant	NA	
3 copies of any stormwater report	<input checked="" type="checkbox"/>	
2 copies of any traffic report	<input checked="" type="checkbox"/>	
10 reduced-sized complete plan sets on 11" x 17" paper	<input checked="" type="checkbox"/>	
4 full-sized complete plan sets on ARCH D or E size paper	<input checked="" type="checkbox"/>	
Payment in full of application fee (Note: an abutter notification fee will be assessed after the application is determined to be complete. The fee is \$0.15 plus the cost of first class postage for each abutter that will be notified as required by the ordinance.)	<input checked="" type="checkbox"/>	
Electronic Copy		
1 CD that includes each of the application documents in Adobe PDF format	<input checked="" type="checkbox"/>	

For Official Use:

\$ _____ Application Fee Paid.	Received By (Initials): _____ Date: _____
\$ _____ Abutter Notification Fee Paid.	Received By (Initials): _____ Date: _____

May 13, 2016

Matt Nazar, Director of Development Services
Members of Augusta Planning Board
City of Augusta
16 Cony Street
Augusta, Maine 04330



Re: Proposed "Expansion of Parking Facility", Kennebec Community Church,
Saint Andrews Street, Augusta, Maine

Dear Matt and Planning Board Members

We are pleased to submit this site plan application package to you for planned expansion to the existing parking facility for Kennebec Community Church, planned at Tax Map 10, Lot 19A, 20 Saint Andrews Street, Augusta, ME. The package includes the information required by the City for Planning Board review and approval. We believe this submission will satisfy the provisions for application completeness and hope to move forward with the Planning Board process. The project will require approval from the City of Augusta Planning Board under the land use and development ordinance for minor development.

Kennebec Community Church owns the parcel of land to be developed. The parcel size is 10.86 acres in size and has frontage along Saint Andrews Street and South Belfast Avenue. The land lies within the RA zone. Adjacent land uses include Cony High School athletic fields, the Augusta Nature Club arboretum, and undeveloped land across St. Andrews Street. The use of the property is a church facility with associated parking. During events at the Church, additional parking is needed. This proposal is to expand the existing paved parking facility with additional parking for Church use.

Existing topographic and property line determinations have been obtained from GIS information within the City of Augusta and State of Maine data bases. We have assembled a property line plan (tax map) and a two foot contour map of existing conditions as shown on the accompanying plan set. The slope of the property varies from 1% along the flatter areas to 10% along the banks of the steeper slopes.

We have reviewed the 100 year flood plain map, panel number 23011C 0528D (dated June 28, 2011), and have determined the parcel does not lie within the 100 year floodplain. Sewer, water, electrical, and telecommunication utilities are available at the site although they will not be utilized for this project.

The proposed development of the parcel is to construct a new 29,187 sf parking lot expansion on land adjacent to the existing parking facility. The 180' wide by 192' parking lot is to be configured such that no new access to Saint Andrews Street is needed. Access will be obtained from the existing entrances off the road. Landscaping islands (10' wide) have been provided to help soften the appearance of the facility and to provide designated travel lanes/parking spaces for the new parking lot.

Our site grading design provides for additional handicap parking stalls along the sidewalk entrance closest to the building. An additional 79 paved parking spaces are shown on the site plan. Striping for handicap parking on the existing parking lot provides for 7 handicap parking stalls. Total parking for the two parking facilities equals 194 spaces. The main parking lot is designed with a 1% slope. We anticipate in/out traffic would be utilized from the current street access.

Lighting for the parking lot will be provided by light pole/bases within the landscape islands at some point in the future. The types/styles of lighting will be shielded lighting that allows light to be cast in a downward fashion only. Once the style of lighting has been selected, a luminaire study will be performed demonstrating no light straying onto abutting properties and submitted to the City for approval.

Erosion control is a critical component to this project as the onsite soils are vulnerable to erosion. We have prepared an erosion control narrative as part of the construction plan set, and located on the topographic site plan specific measures to help limit erosion from the site. The Contractor will be required to implement whatever erosion control devices his construction activities demand to minimize erosion from the site. We have provided a 1' sump within the new detention pond that is to be utilized for sedimentation purposes during construction. The March 2015 edition of the publication "Maine Erosion and Sediment Control Practices Field Guide for Contractors" will be implemented as appropriate.

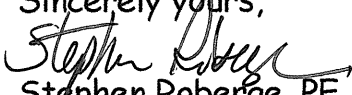
Existing drainage from the parcel flows southerly across the lot towards Saint Andrews Street and enters a drainage swale on abutting property of the City of Augusta. We have provided a land cover site tabulation of the existing versus proposed conditions for the parking lot expansion project (see sheet 2). The proposed condition impervious area increases by 29,187 sf. We are proposing to capture and detain stormwater flows from the new parking area into a detention pond with a storm water control manhole to regulate discharges of storm water flows to pre-existing flow rates. We have prepared a stormwater study (narrative and calculations) to more thoroughly analyze and depict stormwater flows on the site. In summary, the post development flow rates are less than pre-existing flow rates. The pond is to be fenced for safety purposes.

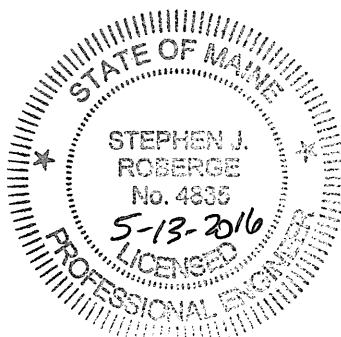
Landscape planting areas have been shown on the plans and will be incorporated into the project. While no planting scheme has been selected at this time, the Owner shall install landscape plantings along the islands. The parking area is currently surrounded by woods and an existing 6' tall earth berm. We feel the parking area is buffered by these existing features such that no additional perimeter landscaping is required. The landscape islands are to be curbed.

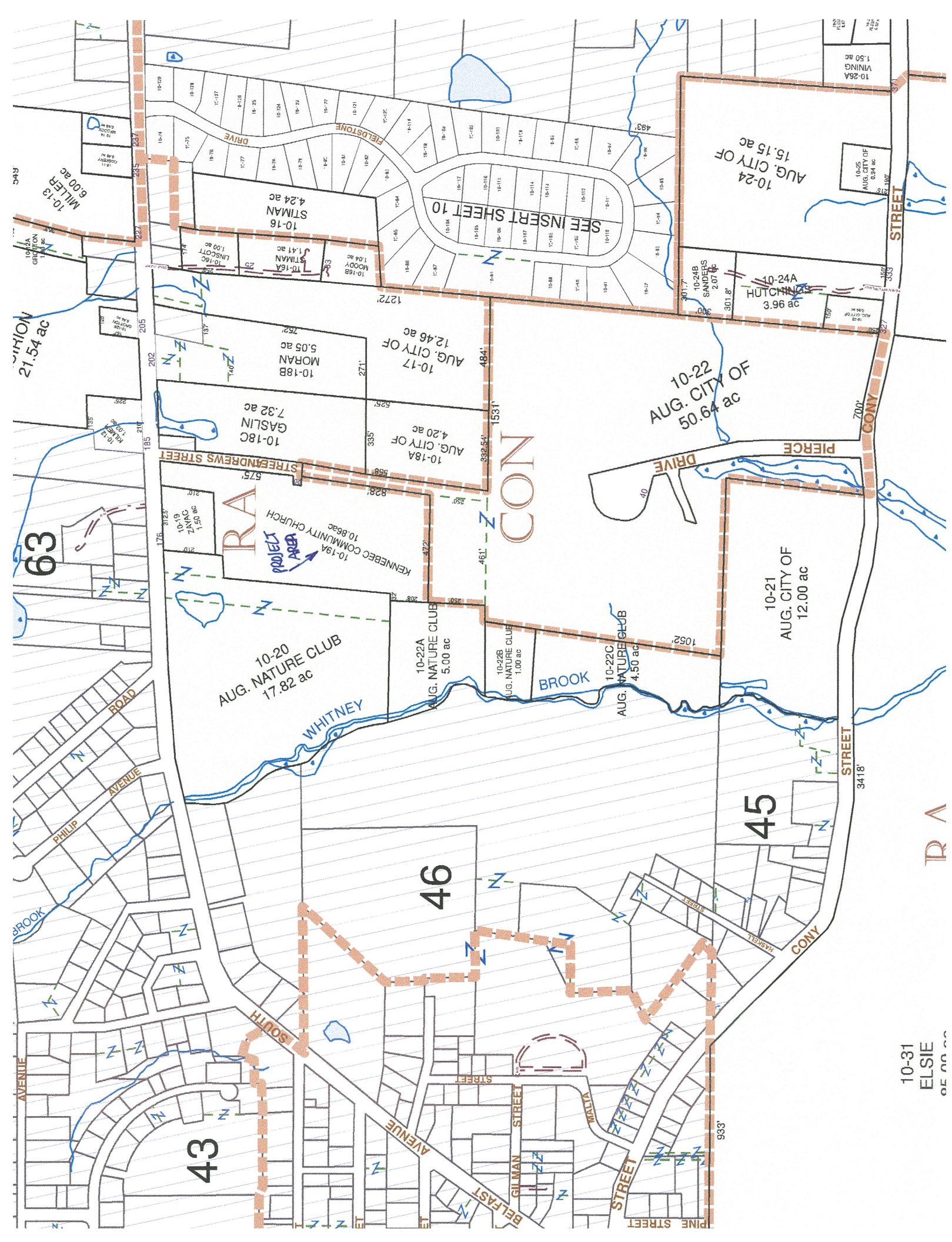
No significant signage for the project is proposed for the project. The Owner will be responsible for any signage that is to be installed on this property once proper permits have been obtained through the Code Enforcement office. Handicap parking signs for the handicap parking stalls will be staked into the ground in front of each designated handicap parking stall.

It is anticipated that the project site infrastructure will begin construction in June 2016 once the project approvals have been obtained and will continue through the summer.

We look forward to presenting this project with you at the June 14th Planning Board meeting. Please call me if you have any questions.

Sincerely yours,

Stephen Roberge, PE
for SJR Engineering Inc.





DATE	PROJECT
APRIL 2004	KENNEBEC COMMUNITY CHURCH
DRAWN BY	SCALE
SAK	1" = 40'

TOPOGRAPHIC SITE PLAN
PARKING LOT EXPANSION
 PREPARED FOR
 KENNEBEC COMMUNITY CHURCH
 20 SAINT ANDREW DRIVE - ALLEGSTA, MAINE

SJR ENGINEERING, INC.
 21 HATFIELD ROAD
 AUGUSTA, MAINE 04330
 (207) 622-1616 ext 101 & fax
 sjr@sjr-engineering.com

REV.	BY:	DATE:	CHANGES:



Exhibit A

A certain lot or parcel of land, situated in said Augusta, and bounded and described as follows, to wit:

Beginning at an iron post on the Southerly side of the South Belfast Road, said iron post being at the Northwesterly corner of land now or formerly of Joseph Zayac; thence running Southerly along said Zayac's Westerly line a distance of fourteen hundred twenty-eight feet (1428') to a fence on the Northerly line of land now or formerly of Herbert T. Bunker et al; thence running Westerly along said fence and Northerly line of said Bunker land a distance of five hundred sixteen feet (516') to a stone post; thence running Northerly a distance of four hundred eight feet (408') along land now or formerly of Augusta Rotary Club and to the Northerly side of a certain right of way; thence running Easterly a distance of two (2) rods to a stone post; thence running Northerly along land now or formerly of Fred W. Jordan a distance of seven hundred twenty-five and one-half feet (725 ½'); thence Easterly along said Jordan land a distance of ninety-nine feet (99'); thence Northerly along said Jordan land a distance of two hundred seventy-five and one-half feet (275 ½') to the Southerly side of said South Belfast Road; thence running Easterly along Southerly side of said Road a distance of four hundred sixty-six and one-half feet (466 ½') to the point of beginning.

TOGETHER WITH a right of way one (1) rod wide over the land formerly owned by Emma R. Sylvester which adjoins the lot hereby conveyed on the Westerly side thereof to the Brook which forms the Westerly boundary of land formerly owned by Emma R. Sylvester, said right of way being that set forth in deed of Emma R. Sylvester to Wilson Sylvester, said deed being dated August 24, 1914, and recorded in Book 544, Page 57, of Kennebec Registry of Deeds.

EXCEPTING from the above described premises a certain lot or parcel of land with the buildings thereon situated as the same was excepted by Roy E. Whitten in his deed to Herbert T. Bunker and Althea H. Bunker of April 30, 1965, recorded in said registry at Book 1375, Page 192; said excepted parcel is more particularly bounded and described as follows:

Commencing at a point in the Southerly line of South Belfast Avenue, said point being the Northeast corner of land now or formerly of Fred W. Jordan; thence extending Easterly along the Southerly line of said South Belfast Avenue a distance of three hundred twelve and five-tenths feet (312.5') to an iron stake set in the ground; thence extending Southerly parallel to the Westerly line of land of Joseph Zayac and one hundred fifty-four feet (154') distant Westerly therefrom, a distance of two hundred ten feet (210') to an iron stake set in the ground; thence extending Westerly to said land now or formerly of Fred W. Jordan; thence extending Northerly along land of said Jordan a distance of two hundred ten feet (210') to the point of beginning.

FURTHER EXCEPTING from the above described premises a certain strip or parcel of land fifty feet (50') in width extending from the Southerly line of South Belfast Avenue, so-called, to other

land now or formerly of Herbert T. Bunker et al, being more particularly bounded and described as follows:

Commencing at an iron pin set in the Southerly line of South Belfast Avenue said pin being five feet (5') distant Westerly from the Northwest corner of land now or formerly of said Joseph Zayac; thence extending Southerly parallel to the Westerly line of said Zayac and five feet (5') distant Westerly therefrom, a distance of fourteen hundred twenty-eight feet (1428') to an iron pin set in the Northerly line of other land now or formerly of Herbert T. Bunker et al; thence extending Westerly along said Bunker land a distance of fifty feet (50') to an iron pin set in the ground; thence extending Northerly parallel to said Zayac's Westerly line and fifty-five feet (55') distant Westerly therefrom, a distance of fourteen hundred twenty-eight feet (1428') to an iron pin set in the Southerly line of said South Belfast Avenue; thence extending Easterly along the Southerly line of said South Belfast Avenue a distance of fifty feet (50') to the point of beginning.

ALSO CONVEYING to said Grantee, its successors and assigns, the right and easement to pass and repass on foot and with vehicles for all purposes including the right and easement to lay out, establish and maintain all utilities over, along and across said fifty foot (50') strip of land hereinabove excepted.

FURTHER EXCEPTING from the above described premises the property and rights conveyed pursuant to (i) the deed from the Roman Catholic Bishop of Portland to the City of Augusta, dated January 20, 2004 and recorded in said registry at Book 7885, Page 165 and (ii) easement deed from the Roman Catholic Bishop of Portland to Central Maine Power Company, notarized on August 10, 2010 and recorded in said registry at Book 10530, Page 180, the above described premises herein conveyed further being SUBJECT TO the terms and conditions expressed in said two deeds.

FOR SOURCE OF TITLE, reference may be had to deed from Herbert T. Bunker and Aletha W. Bunker, dated April 20, 1965, and recorded in the Kennebec County Registry of Deeds at Book 1375, Page 195.

The above-described premises are conveyed SUBJECT to the restrictions that the Grantee, Grantee's successors and assigns, shall not use the premises in any way relating to: 1)

counseling regarding or performance of abortions; 2) sale or distribution of pornographic materials; or 3) erotic displays or activities. The burden of this restriction shall run with the land conveyed hereby to the Grantee. The benefit of this restriction is held by the Roman Catholic Bishop of Portland, corporation sole, its successors and assigns.



KENNEBEC

Community Church

20 Saint Andrews Street, Augusta, Maine

BMP/Maintenance Plan



Prepared by:
Steve Roberge
SJR Engineering Inc.
21 Mayflower Road
Augusta, Maine 04330
Tel/Fax: 1-207-622-1676

May 13, 2016

Kennebec Community Church, Augusta, Maine

Best Management Practices and Maintenance Plan

Date: May 13, 2016

Kennebec Community Church will be responsible for maintenance and operations of the stormwater system.

INSPECTIONS - During Construction and Post Construction

Areas of construction that will require maintenance of the stormwater system include the following:

- **Detention/Retention/Infiltration Facilities**
 - Embankment inspection and maintenance
 - Spillway maintenance
 - Sediment removal and disposal
- **Ditches, Swales, or other open stormwater channels**
 - Embankment inspection and maintenance
 - Channel inspection
 - Sediment removal and disposal
- **Culverts, catch basins, stormwater control structures**
 - Embankment inspection and maintenance
 - Inlet and Outlet inspection
 - Debris removal and disposal
- **Buffers**
 - Road Embankment inspection and maintenance
 - Inlet and Outlet inspection
 - Debris removal and disposal

The Owners representative will inspect the detentio pond, swales, channels, and stormwater structures to determine if the soil blockage or impaired capacity to pass flow exists. Inspections will be performed on a monthly basis from March to November, and quarterly during the remainder of the year. A record of inspections and maintenance or corrective measures shall be kept by the owner.

MAINTENANCE AND CLEANING

The owner will regularly inspect for sediment accumulation, obstructions, debris, and other potential causes for operational difficulty in the conveyance and detention system. Immediate action shall be taken to remedy detrimental obstructions.

The owner will regularly inspect the detention pond after every major storm event in the first few months to ensure proper function. There after the pond should be inspected bi-annually to ensure that they draining within 24 hours. Sediment shall be removed from the pond when sediment reduces the pond volume by 25% and/or the pond does not infiltrate the water within 24 hours. The removed sediment shall be hauled off site and disposed in an approved location. Mowing of the pond area shall be limited to 2 times per year to maintain grass heights to less than 12". Weeding and pruning of growth within the pond and pond back slopes will be completed as necessary. The pond outlet shall be inspected for erosion and make repairs as needed annually.

A mandatory scheduled maintenance will be performed every four weeks for a period of one hundred and twenty (120) days and will begin after satisfactory completion and acceptance of landscape construction. Ongoing maintenance will be required as necessary.

All sand, salt, etc. accumulated when sweeping the paved parking and display areas, shall be trucked off-site for disposal.

RECORD KEEPING

The owner will maintain inspection records, with recordings of condition of basins, and pipes and annotation of substantial precipitation events or mitigating circumstances in the intervening time for trending to develop the anticipated preventive maintenance schedule.

MAINTENANCE CONTRACT

Should proprietary devices be utilized, a maintenance contract will be established with the manufacturer for regular maintenance and cleaning of the device.

RE-CERTIFICATION

The owner shall submit a certification to Maine DEP within three months of the expiration of each five year interval from the date of issuance of the permit. The owner shall submit the maintenance log which identifies inspections completed, erosion problems found, when corrective action was taken, and who completed the work. The certification will include a statement indicating that the stormwater system is working and is being maintained in working condition in accordance with the permit requirements.

Housekeeping

These performance standards apply to all projects.

1. Spill prevention. Controls must be used to prevent pollutants from being discharged from materials on site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.
2. Groundwater protection. During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

3. Fugitive sediment and dust. Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

NOTE: An example of the use of BMPs to control fugitive sediment and dust is as follows: Operations during wet months that experience tracking of mud off the site onto public roads should provide for sweeping of road areas at least once a week and prior to significant storm events. Where chronic mud tracking occurs, a stabilized construction entrance should be provided. Operations during dry months, that experience fugitive dust problems, should wet down the access roads once a week or more frequently as needed.

NOTE: Dewatering a stream without a permit from the department violates state water quality standards and the Natural Resources Protection Act.

4. Debris and other materials. Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

NOTE: To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. Trench or foundation de-watering. Trench de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the department.

NOTE: For guidance on de-watering controls, consult the Maine Erosion and Sediment Control BMPs", Maine Department of Environmental Protection."

6. Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges.

7. Additional requirements. Additional requirements may be applied on a site-specific basis.

Maintenance Plan for Ponds & Best Management Practices

Site Inspection & Maintenance During Construction: Weekly inspections, as well as routine inspections following rainfalls, shall be conducted by the General Site Contractor of all temporary and permanent erosion control devices until final acceptance of the project (85% grass catch). Necessary repairs shall be made to correct undermining or deterioration. Final acceptance shall include a site inspection to verify the stability of all disturbed areas and slopes. Until final inspection, all erosion and sedimentation control measures shall immediately be cleaned, and repaired by the General Contractor as required. Disposal of all temporary erosion control devices shall be the responsibility of the General Contractor.

It is recommended that the Owner hire the services of the design engineer, or other qualified individual, to provide compliance inspections (during active construction) relative to implementation of the Stormwater and Erosion Control Plans. Such inspections should be limited to once a week or as necessary and be reportable to the Owner, City, and MeDEP.

Maintenance Agreement: Short-term sedimentation maintenance shall be the responsibility of the Contractor to clean out all swales, structures, and infiltration and soil filter ponds prior to turning project over to the Owners. After project turnover, the Owner shall be the responsible party for inspecting and maintaining a pond and proper functioning of all stormwater conveyance practices and measures. The Owner may assign an environmental manager to carry out specific tasks identified below.

Soil Filter, Infiltration, Detention, and Wet Ponds

Clearing Inlets and Outlets of Ponds (where applicable): The inlet and outlet of a pond shall be checked periodically to ensure that flow structures are not blocked by debris. All ditches and pipes connecting ponds in series shall be checked for debris that may obstruct flow. Inspections shall be conducted monthly during wet weather conditions from March to November.

Basin Inspections: Ponds shall be inspected on an annual basis for erosion, destabilization of side slopes, embankment settling, and other signs of structural failure. Brief inspections shall be conducted following major storms. Corrective action shall be taken immediately upon identification of problem area. Records shall be kept of all maintenance operations at jobsite to help plan future work and identify problem areas.

Maintenance Dredging: Ponds typically lose 1% of their volume annually due to sediment accumulation. Dredging is required when accumulated volume loss reaches 15% or approximately every 15-20 years.

Drainage Area Inspections: The owners' environmental manager shall inspect the basin's drainage area semi-annually for eroding soil and other sediment sources. Repair eroding areas using appropriate erosion control BMP's immediately. Control sediment sources, such as stockpiles of winter sand, by removing them from the basin's drainage area or surrounding them with sediment control BMP's.

Mowing: A basin with a turf lining shall have its side-slopes and top of berm mowed at least twice a year to prevent woody growth. Clippings shall be removed to minimize the amount of organic material accumulating in the basin.

Sediment Removal: Remove accumulated debris and sediments from the sediment forebays, inlet plunge pools, and pre-treatment BMP's at least annually.

Snow Storage: The ponds are not to be used for snow storage. Snow storage shall be sited so that snowmelt flows to a pre-treatment BMP before reaching the infiltration basin.

Pedestrian Access: Limit access to ponds to passive recreational use.

Vehicle Access: Prohibit vehicle access to all ponds, except that authorized for maintenance.

Structures and Other Measures

Sweeping: Paved parking lots and streets shall be mechanically swept twice per year. The first shall take place in the fall. The second sweeping shall take place after winter sanding operations terminate, prior to May 1.

Ditches/Swales: Open swales and ditches need to be inspected on a monthly basis or after a major rainfall event to assure that debris or sediments do not reduce the effectiveness of the system. Debris needs to be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth to vegetation for the stability of the structure and proper functioning.

Vegetated Ditches: Vegetative should be mowed at least monthly during the growing season to a height of not less than 3 inches. Larger brush or trees must not be allowed to become established in the channel. Unless finely mulched, clippings should be

removed to minimize the amount of organic material accumulating in the swales. Any areas where the vegetation fails will be subject to erosion and should be repaired and revegetated.

Stone Lined Channels: Where stone is displaced from constructed riprap areas, it should be replaced and chinked to assure stability. With time, riprap may need to be added. Vegetation growing through riprap should be removed on a yearly schedule.

Culverts: If sediment in culverts or piped drainage systems exceeds 20% of the diameter of the pipe, it should be removed. This may be accomplished by mechanical means or hydraulic flushing. Care should be taken to prevent the release of the sediments into the downstream receiving areas. All pipes should be inspected on an annual basis.

Catch Basin/Field Inlets: All catch basins, and any other field inlets throughout the collection system, need to be inspected on a monthly basis to assure that the inlet entry point is clear of debris and will allow the intended water entry. At that time, these will be cleared if necessary. On a yearly basis, or when sediment reaches two thirds of the total volume, catch basins need to be vacuumed and cleaned of all accumulated sediment. Work must be done by a vacuum truck. The removed material must be disposed of in accordance with State of Maine Solid Waste Disposal Rules.

Level Spreaders & Ditch Turnout Sediment Traps: Inspect and remove debris. Inspect for flow bypass or undermining. Repair any channelization if occurring and remove sediment build-up to assure potential storage volume and sheet flow characteristics of the discharge lip. Perform inspection on a semi-annual basis at a minimum. All work should be performed from the up gradient side, do not disturb the down gradient receiving area or discharge edge.



KENNEBEC

Community Church

20 Saint Andrews Street, Augusta, Maine

Stormwater Analysis

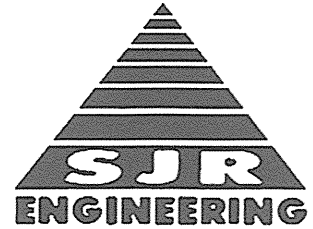


Prepared by:
Steve Roberge
SJR Engineering Inc.
21 Mayflower Road
Augusta, Maine 04330
Tel/Fax: 1-207-622-1676

May 13, 2016

May 5, 2016

Mr. Colin Miller
Kennebec Community Church
Saint Andrews Street
Augusta, Maine 04330



Re: Stormwater Analysis for Kennebec Community Church parking lot expansion, Saint Andrews St., Augusta

Dear Colin,

Kennebec Community Church is proposing to construct a new 192' by 180' parking lot expansion adjacent to the existing paved parking lot. Most of the site in the vicinity of the new construction was wooded prior to a recent clearing of the area. It is anticipated that this project will be constructed during this construction season (2016).

We have prepared the plans and details in order to properly evaluate existing and proposed stormwater impacts from the development. Stormwater runoff in this proposed construction area is bounded by one drainage area. Design Point 1 is a low point at the corner of the existing parking lot and Saint Andrews Street. Stormwater flows will be attenuated by diverting and capturing stormwater flows from the new construction including portions of the existing impervious area and wooded areas. In summary, the proposed stormwater flows will be less than or equal to the existing condition stormwater flows. No downstream impacts from stormwater flows are expected with this proposal.

Stormwater Quantity - Existing Site Conditions

The existing site being proposed for new construction is a mixture of undeveloped property consisting of woods and meadow/grass area, and developed property consisting of existing parking lot area. Existing

conditions have recently changed with some clearing activity along the parcel. The topography of the proposed developed site is shown at a two foot contour interval. The slope of the property varies from 1% along the flatter areas to 10% along the steeper slopes.

Soils mapping was taken from Kennebec County Soil Survey medium intensity mapping. These soils have been overlaid onto the site development plan. Soils are identified as being Hollis fine sandy loam (hydrological group "D" permeability). The hydrological group rating is a rating system of the relative permeability of the soil with Group "A" being extremely permeable such as a beach sand, to Group "D" being slow draining such as a wetland area.

I have reviewed the drainage characteristics of the site which includes proposed pavement, lawn areas, and remaining woods. The analysis requires post construction stormwater flow rates to be approximately equal to or less than the existing stormwater rates.

I have used the SCS TR-20 (HydroCad 8.5 computer model) method of computing stormwater runoff peak flow rates. This method accounts for soil types, existing land uses, topography, vegetative cover, and proposed land use for the parcel to be developed. The proposed conditions were analyzed using data for a type III, 24 hour storm distribution with a design frequency of occurrence of 2/10/25 years. One day precipitation values of 2.8"/4.2"/5.2" have been used for each respective event. All supporting calculations and data are submitted with this report.

The existing and proposed site conditions were analyzed using information taken from the SJR Engineering prepared plan of the parcel to be developed. Impervious areas, lawns, meadows, and woods areas for each hydrological soil condition were measured by planimeter in order to calculate a weighted curve number that typifies the drainage condition of the site.

Proposed Watershed area 1 to Design Point 1

We have calculated the existing stormwater flows in the depicted watershed area that drain to the common design point along the parking lot corner with Saint Andrews Street (Design Point). Existing flows are calculated to be 1.70/3.21/4.33 cfs for the 2/10/25 year storm events at the Design Point.

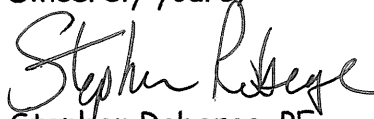
In the proposed condition, we have depicted the watershed boundary of the proposed watershed and directed runoff water to a new detention pond to be constructed

along the lower corner of the expanded parking lot. This new watershed includes new/existing pavement areas, grassed area, landscaped areas, and remaining woods. The detention pond has been sized to accommodate and store flows for stormwater quantity in order to control flows to pre-development runoff conditions at the Design Point. We have calculated significant increases in flow rates in the developed portion of the project for the 2/10/25 year storm events. By constructing the detention pond and sizing the inlets to the stormwater control structure, stormwater flows are captured and contained. These increased flows are then stored (detained) within the pond area for short periods of time (less than 20 hours for 25 year storm event) allowing existing peak flow rates to be maintained. Our analysis indicates that the incoming flow rates to the pond (2.49/4.22/5.46 cfs) are reduced to 1.56/3.14/4.33 cfs at the culvert outlet from the pond. The detention pond ground elevation is set at elevation 195.00 in order to provide a sedimentation area within the pond during construction. The water elevation within the pond is expected to peak at elevations 197.76/198.49/198.87 for the 2/10/25 year storm events.

The detention pond has a control manhole structure with a 18" diameter outlet pipe. The control manhole has 3 specified openings to control runoff flows. The lowest opening is a 7" diameter orifice at elevation 196.00, the second opening is a 9" wide by 6" high opening at elevation 197.76, and the third opening is a 12" wide by 3" high orifice at elevation 198.49. The control manhole is to have a 24" diameter horizontal hole at the top of the manhole at elevation 199.00. The pipe outlet is to be riprapped with D50 12" angular riprap on a filter fabric. A 6' wide riprapped emergency spillway is to be constructed at elevation 199.5 as part of the detention pond for storm events larger than the 25 year event. This will act as the emergency overflow should the outlet culvert become plugged or a larger storm event occur. The top of the berm is to be constructed to elevation 200.0.

Please feel free to contact me if you have any questions concerning the calculations of stormwater from this project. It is important to note that proper erosion control and revegetation of disturbed areas are essential for the proper operation of the stormwater facilities. Maintenance of the yard parking lot areas and careful attention to the pavement/seeded interface must be a top priority in order for the system to function properly. Thank you for involving this firm on your project.

Sincerely yours


Stephen Roberge, PE
for SJR Engineering Inc.



Kennebec Community Church

Parking Lot Expansion

Project Summary

Stormwater Flows at Design Point

	<u>2 year</u>	<u>10 year</u>	<u>25 year</u>
Existing Conditions at Design Point	1.70 cfs	3.21 cfs	4.33 cfs
Proposed Conditions at Design Point	1.56 cfs	3.14 cfs	4.32 cfs
Detention Pond inflow/outflow	2.49/1.56 cfs	4.22/3.14 cfs	5.46/4.33 cfs
Elevation height of detained water in pond	197.76	198.49	198.87

The detention pond is expected to operate as a sediment pond during construction for water quality purposes. No water will flow from the pond until the water elevation reaches elevation 196.0, which is the inlet elevation of the lowest 7" diameter stormwater control manhole orifice. A second 9" wide by 6" high orifice at elevation 197.76 within the control structure will control the 10 year storm event. A third opening, 12" wide by 3" high orifice at elevation 198.49 within the control structure will control the 25 year storm event. The control structure is to have a 36" horizontal opening (top of control structure) at elevation 199.0. The stormwater control structure has an 18" diameter outlet that discharges offsite. A 6' long 4' wide rock lined emergency spillway has been provided at elevation 199.5. The detention pond bottom elevation is at elevation 195.0. The top of berm elevation is 200.00.

REV	BY	DATE	CHANGE

THIS PLAN SHALL NOT BE HOODED WITHOUT WRITTEN PERMISSION FROM S&R ENGINEERING, INC.



S&R ENGINEERING, INC.
 21 HATFIELD ROAD
 ALBUSTA, MAINE 04530
 (207) 822-1676 FAX
 alvarez@ring.com

TOPOGRAPHIC SITE PLAN
PARKING LOT EXPANSION
PREPARED FOR
KENNEBEC COMMUNITY CHURCH
 20 SAINT ANDREW DRIVE - ALBUSTA, MAINE

DATE	PROJECT	SUR #
APRIL 2006		
DRAWN BY	SCALE	
S&R	1" = 40'	

SHEET 1



Soil Map—Kennebec County, Maine (Kennebec Community Church)
























































































































































































































Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/17/2016
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)		Area of Interest (AOI)		Spoil Area	
Soils		Soils		Stony Spot	
		Soil Map Unit Polygons		Very Stony Spot	
		Soil Map Unit Lines		Wet Spot	
		Soil Map Unit Points		Other	
Special Point Features		Water Features		Special Line Features	
		Streams and Canals			
		Transportation			
		Rails			
		Interstate Highways			
		US Routes			
		Major Roads			
		Local Roads			
		Background			
		Aerial Photography			
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kennebec County, Maine
Survey Area Data: Version 14, Sep 14, 2015

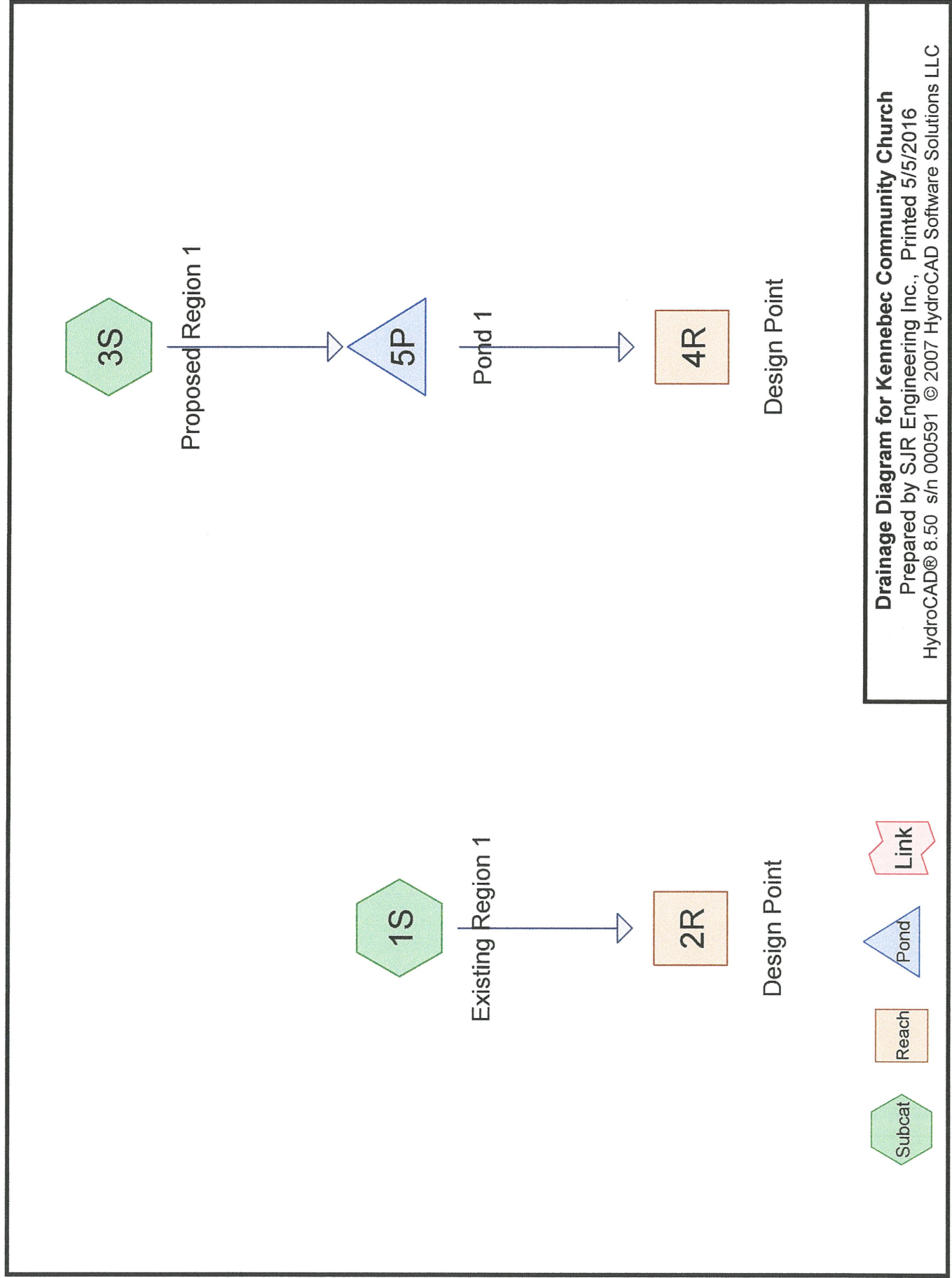
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 15, 2013—Aug 21, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

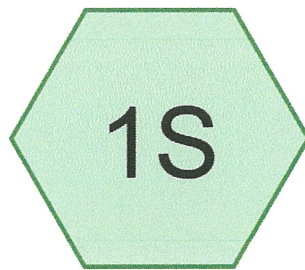
Kennebec County, Maine (ME011)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BuB2	Buxton silt loam, 3 to 8 percent slopes, eroded	12.9	24.1%
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	11.0	20.5%
HrB	Hollis fine sandy loam, 3 to 8 percent slopes	28.9	54.1%
ScA	Scantic silt loam, 0 to 3 percent slopes	0.7	1.3%
Totals for Area of Interest		53.5	100.0%



Drainage Diagram for Kennebec Community Church

Prepared by SJR Engineering Inc., Printed 5/5/2016

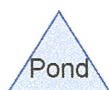
HydroCAD® 8.50 s/n 000591 © 2007 HydroCAD Software Solutions LLC



Existing Region 1



Design Point



Kennebec Community Church

Prepared by SJR Engineering Inc.

HydroCAD® 8.50 s/n 000591 © 2007 HydroCAD Software Solutions LLC

Printed 5/12/2016

Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.139	80	>75% Grass cover, Good, HSG D (1S)
1.363	83	Woods, Poor, HSG D (1S)
0.153	98	Paved parking & roofs (1S)

Summary for Subcatchment 1S: Existing Region 1

Runoff = 1.70 cfs @ 12.31 hrs, Volume= 0.172 af, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

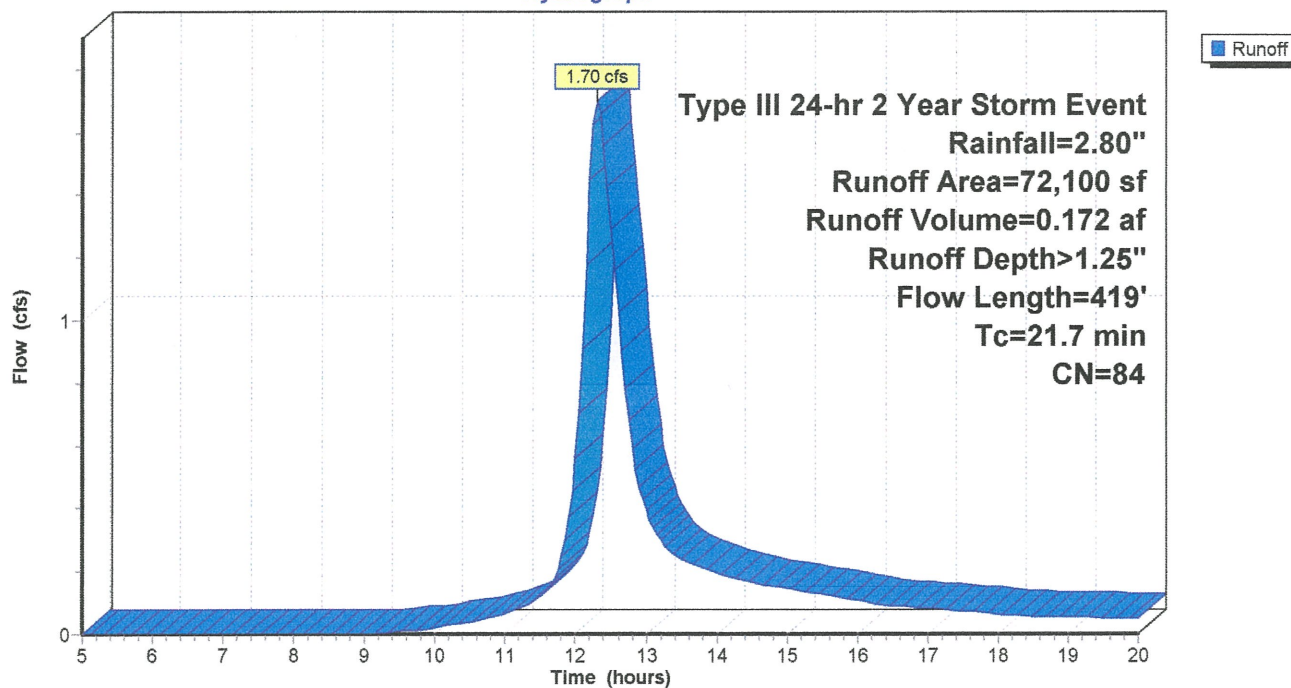
Type III 24-hr 2 Year Storm Event Rainfall=2.80"

Area (sf)	CN	Description
6,658	98	Paved parking & roofs
59,385	83	Woods, Poor, HSG D
6,057	80	>75% Grass cover, Good, HSG D
72,100	84	Weighted Average
65,442		Pervious Area
6,658		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
5.7	319	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	419	Total			

Subcatchment 1S: Existing Region 1

Hydrograph



Summary for Reach 2R: Design Point

Inflow Area = 1.655 ac, 9.23% Impervious, Inflow Depth > 1.25" for 2 Year Storm Event event
Inflow = 1.70 cfs @ 12.31 hrs, Volume= 0.172 af
Outflow = 1.70 cfs @ 12.31 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.44 fps, Min. Travel Time= 0.1 min

Avg. Velocity= 0.97 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.31 hrs, Average Depth at Peak Storage= 0.11'

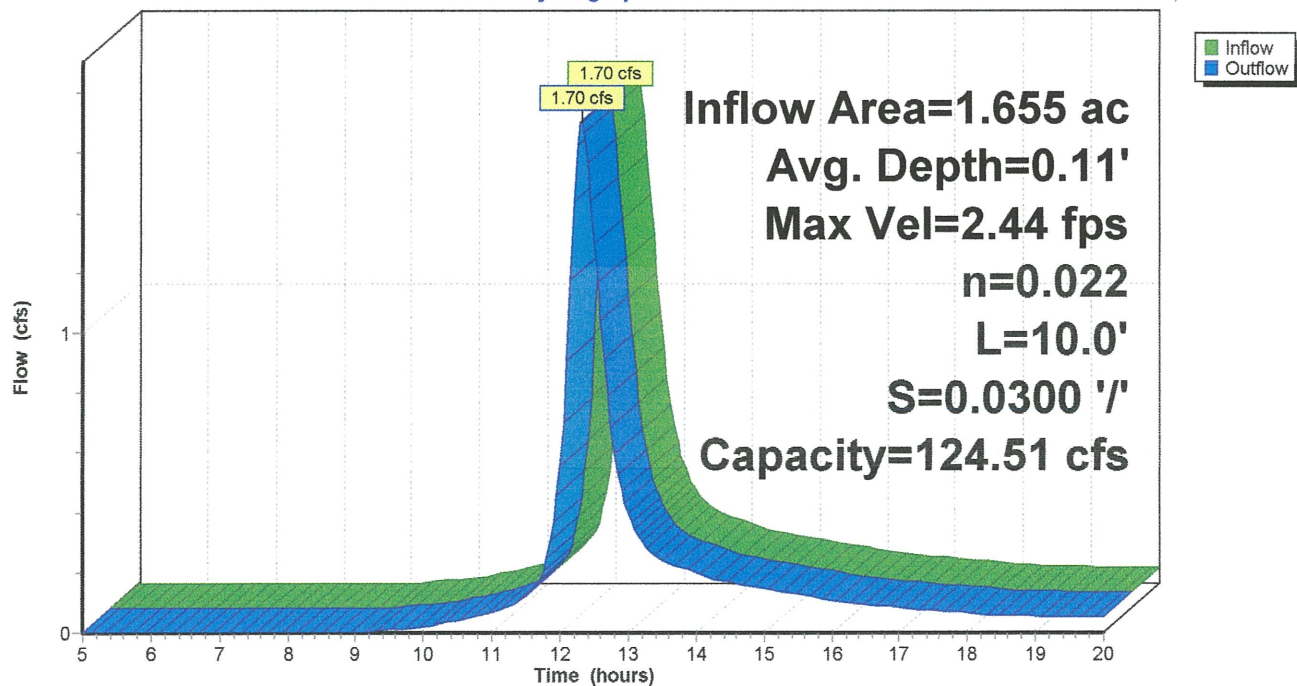
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

**Reach 2R: Design Point****Hydrograph**

Summary for Subcatchment 1S: Existing Region 1

Runoff = 3.21 cfs @ 12.30 hrs, Volume= 0.327 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

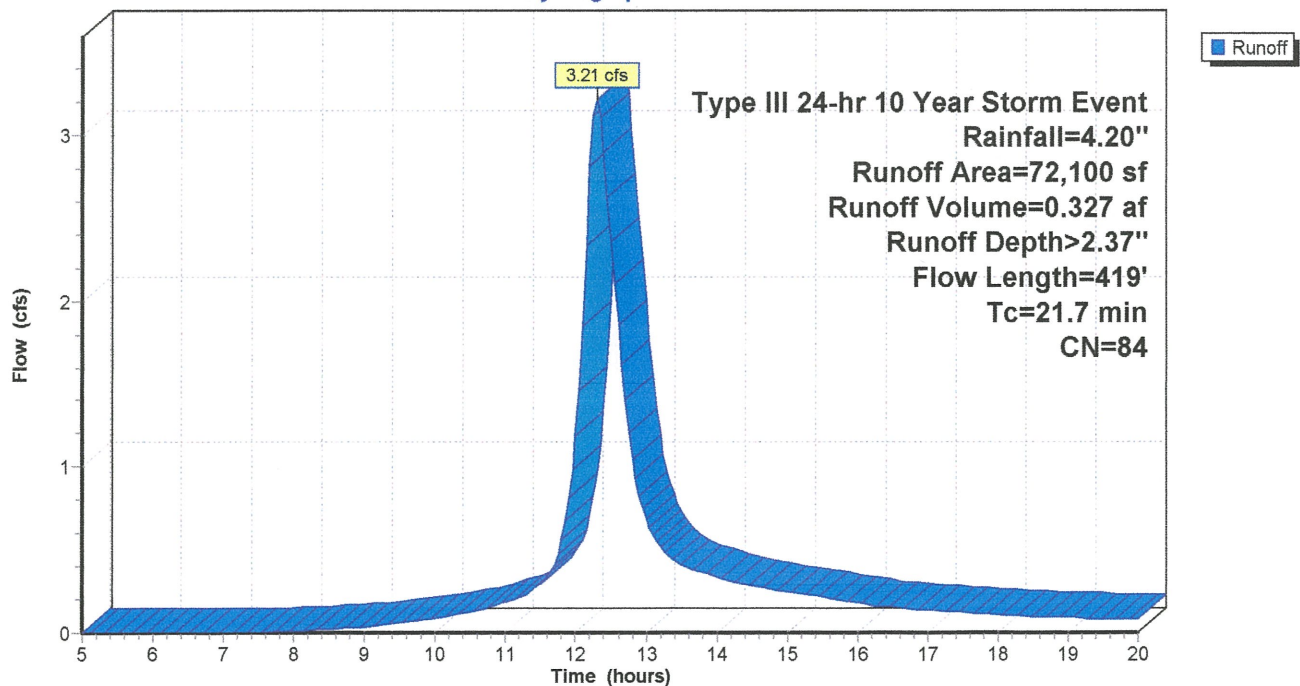
Type III 24-hr 10 Year Storm Event Rainfall=4.20"

Area (sf)	CN	Description
6,658	98	Paved parking & roofs
59,385	83	Woods, Poor, HSG D
6,057	80	>75% Grass cover, Good, HSG D
72,100	84	Weighted Average
65,442		Pervious Area
6,658		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
5.7	319	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	419	Total			

Subcatchment 1S: Existing Region 1

Hydrograph



Summary for Reach 2R: Design Point

Inflow Area = 1.655 ac, 9.23% Impervious, Inflow Depth > 2.37" for 10 Year Storm Event event
Inflow = 3.21 cfs @ 12.30 hrs, Volume= 0.327 af
Outflow = 3.21 cfs @ 12.30 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.00 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.13 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 12.30 hrs, Average Depth at Peak Storage= 0.16'

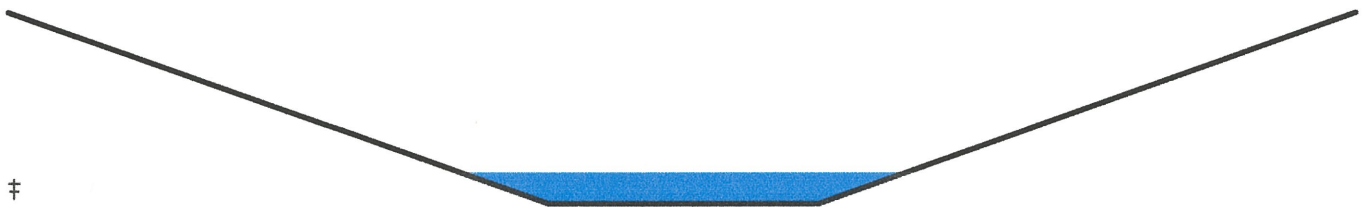
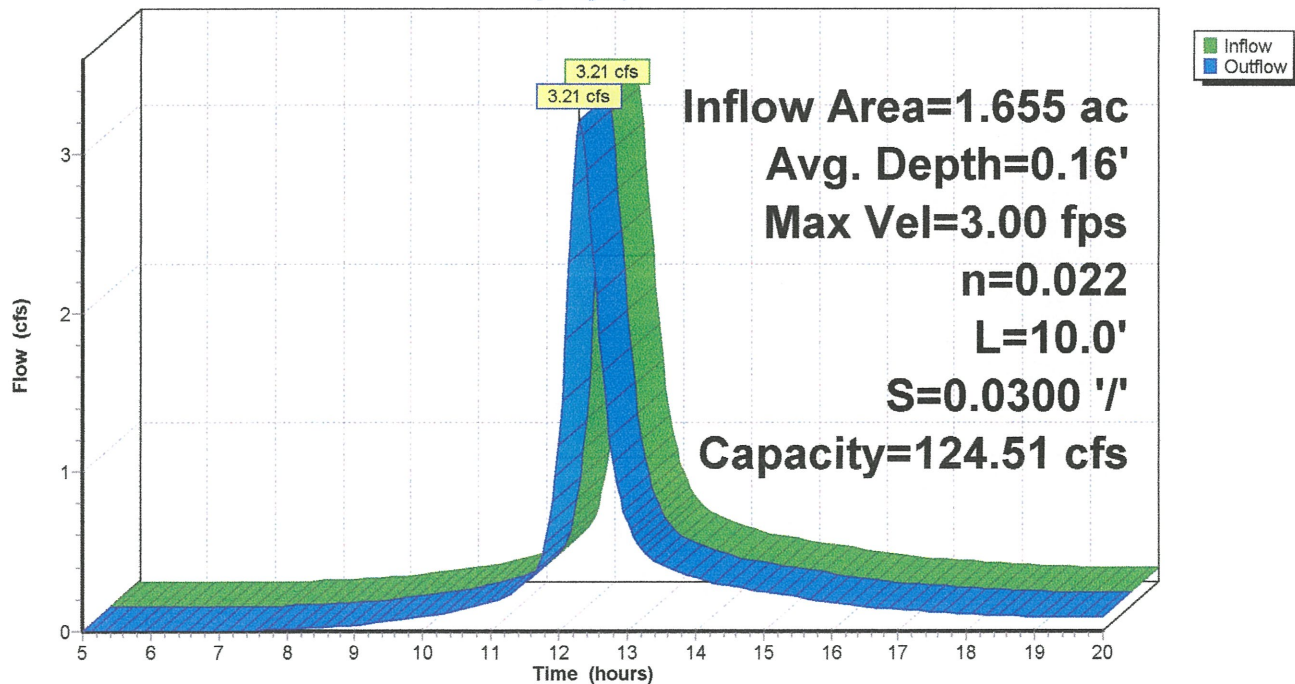
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

**Reach 2R: Design Point****Hydrograph**

Summary for Subcatchment 1S: Existing Region 1

Runoff = 4.33 cfs @ 12.30 hrs, Volume= 0.445 af, Depth> 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

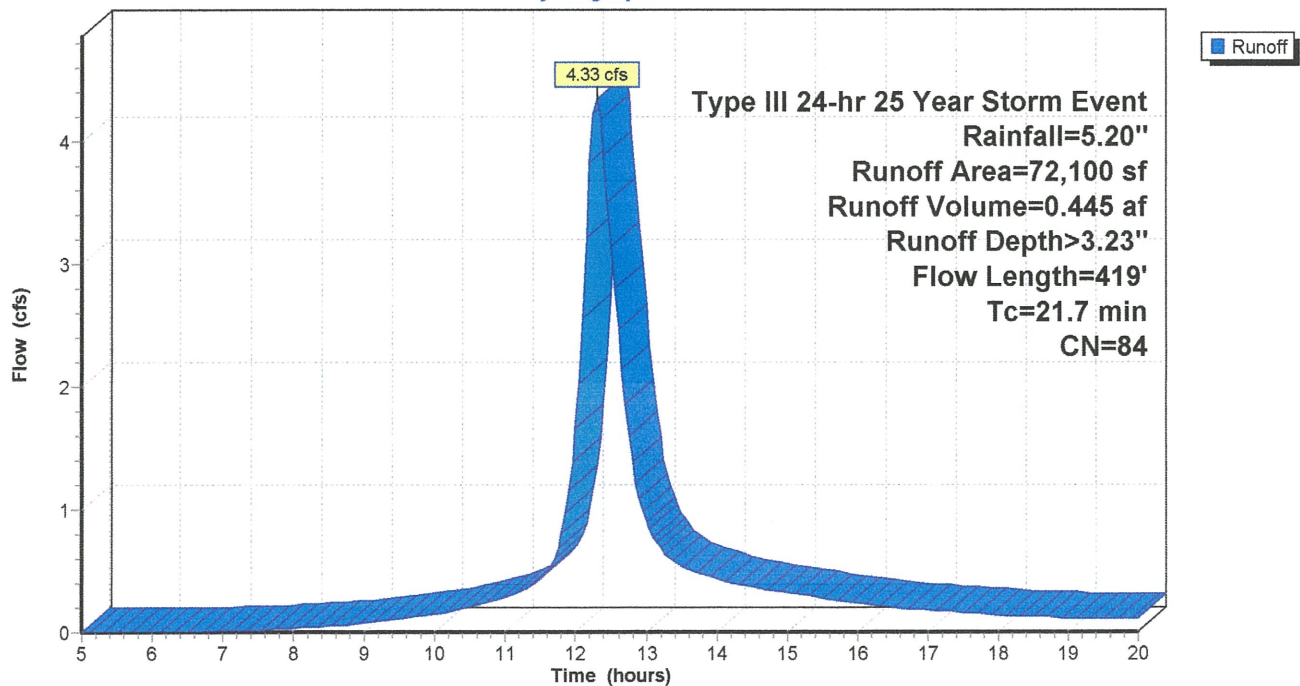
Type III 24-hr 25 Year Storm Event Rainfall=5.20"

Area (sf)	CN	Description
6,658	98	Paved parking & roofs
59,385	83	Woods, Poor, HSG D
6,057	80	>75% Grass cover, Good, HSG D
72,100	84	Weighted Average
65,442		Pervious Area
6,658		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
5.7	319	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	419	Total			

Subcatchment 1S: Existing Region 1

Hydrograph



Summary for Reach 2R: Design Point

Inflow Area = 1.655 ac, 9.23% Impervious, Inflow Depth > 3.23" for 25 Year Storm Event event
 Inflow = 4.33 cfs @ 12.30 hrs, Volume= 0.445 af
 Outflow = 4.33 cfs @ 12.30 hrs, Volume= 0.445 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.29 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.21 fps, Avg. Travel Time= 0.1 min

Peak Storage= 13 cf @ 12.30 hrs, Average Depth at Peak Storage= 0.19'

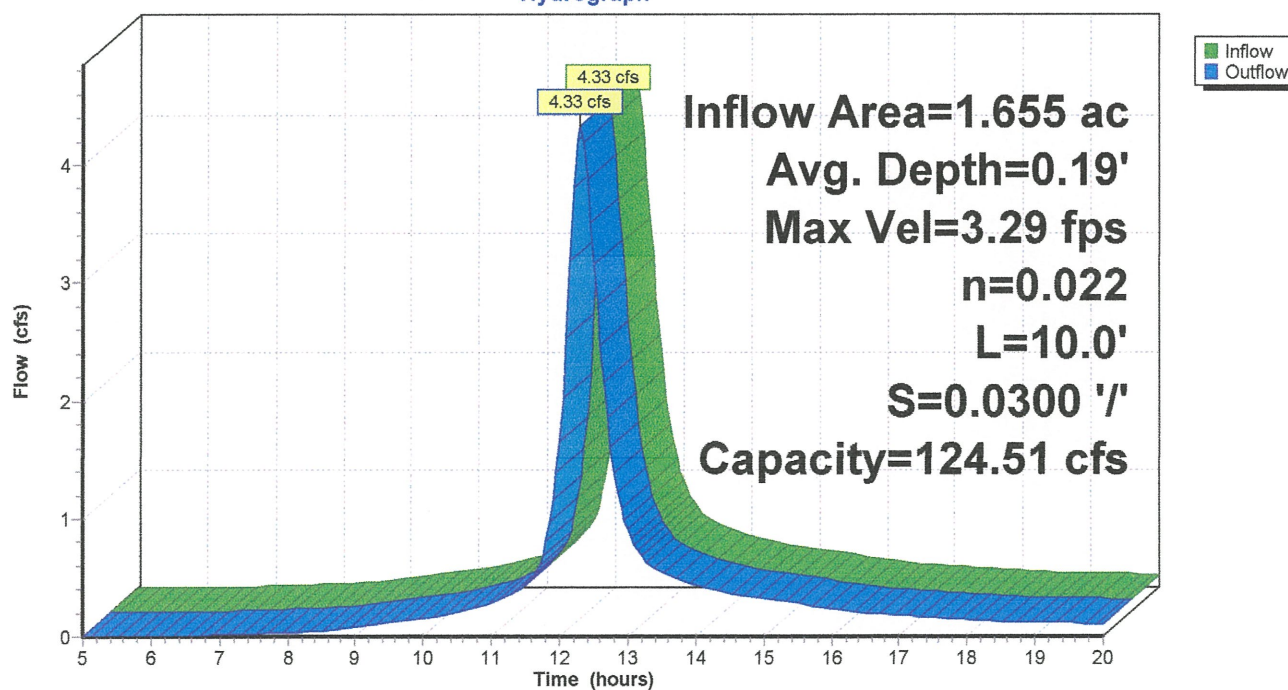
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

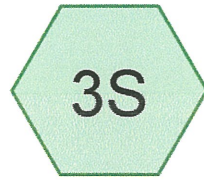
5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

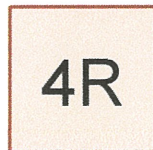
**Reach 2R: Design Point****Hydrograph**



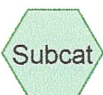
Proposed Region 1



Pond 1



Design Point



Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.396	80	>75% Grass cover, Good, HSG D (3S)
0.437	83	Woods, Poor, HSG D (3S)
0.823	98	Paved parking & roofs (3S)

Summary for Subcatchment 3S: Proposed Region 1

Runoff = 2.49 cfs @ 12.23 hrs, Volume= 0.232 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

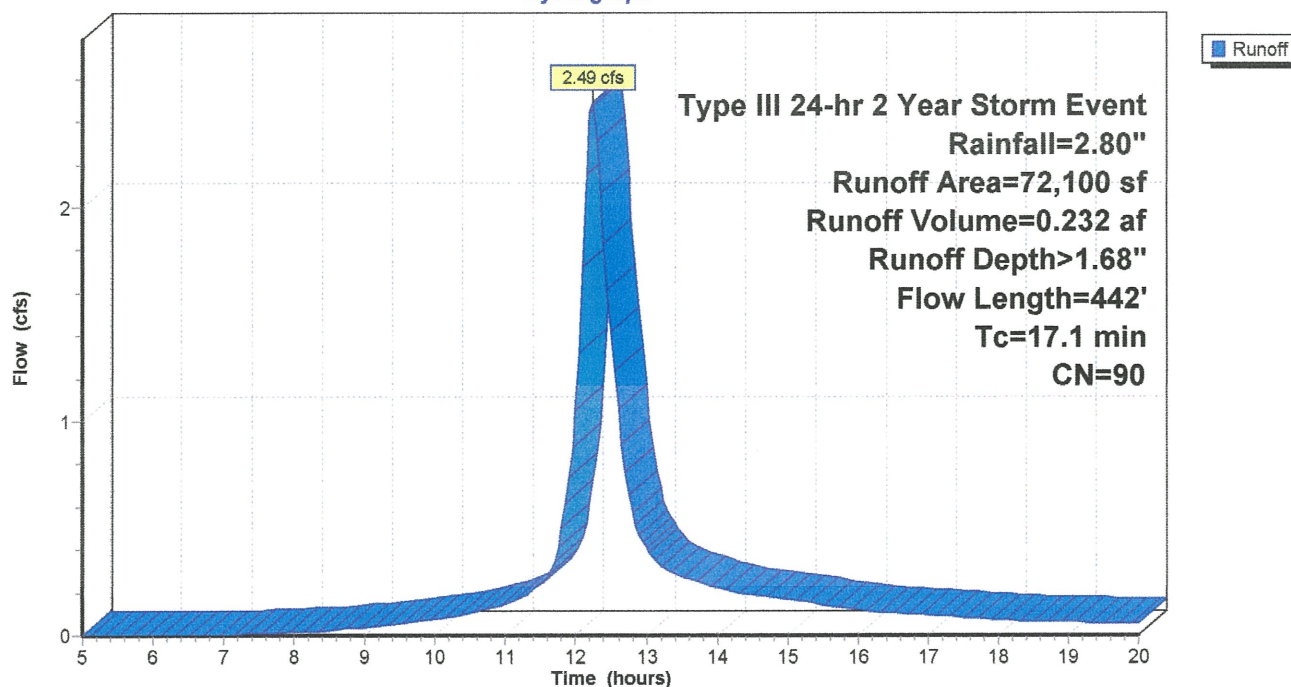
Type III 24-hr 2 Year Storm Event Rainfall=2.80"

Area (sf)	CN	Description
35,850	98	Paved parking & roofs
19,020	83	Woods, Poor, HSG D
17,230	80	>75% Grass cover, Good, HSG D
72,100	90	Weighted Average
36,250		Pervious Area
35,850		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
0.4	30	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	312	0.0110	7.42	178.05	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=2.00' Z= 5.0 '/' Top.W=22.00' n= 0.022 Earth, clean & straight
17.1	442	Total			

Subcatchment 3S: Proposed Region 1

Hydrograph



Summary for Reach 4R: Design Point

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 1.67" for 2 Year Storm Event event
Inflow = 1.56 cfs @ 12.47 hrs, Volume= 0.230 af
Outflow = 1.56 cfs @ 12.47 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.38 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 0.99 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.47 hrs, Average Depth at Peak Storage= 0.11'

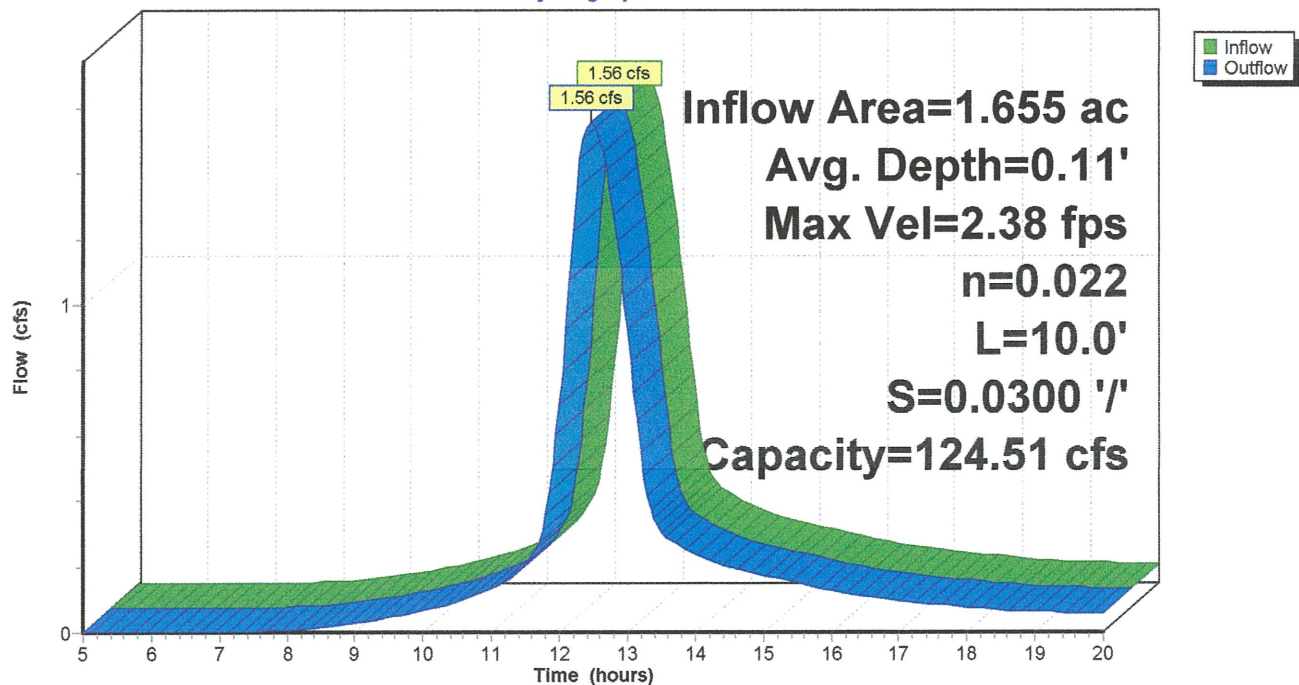
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

**Reach 4R: Design Point****Hydrograph**

Summary for Pond 5P: Pond 1

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 1.68" for 2 Year Storm Event event
 Inflow = 2.49 cfs @ 12.23 hrs, Volume= 0.232 af
 Outflow = 1.56 cfs @ 12.47 hrs, Volume= 0.230 af, Atten= 37%, Lag= 13.9 min
 Primary = 1.56 cfs @ 12.47 hrs, Volume= 0.230 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 197.76' @ 12.47 hrs Surf.Area= 1,239 sf Storage= 1,594 cf

Plug-Flow detention time= 14.6 min calculated for 0.230 af (99% of inflow)
 Center-of-Mass det. time= 11.5 min (799.4 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	196.00'	5,432 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
196.00	574	0	0
198.00	1,330	1,904	1,904
200.00	2,198	3,528	5,432

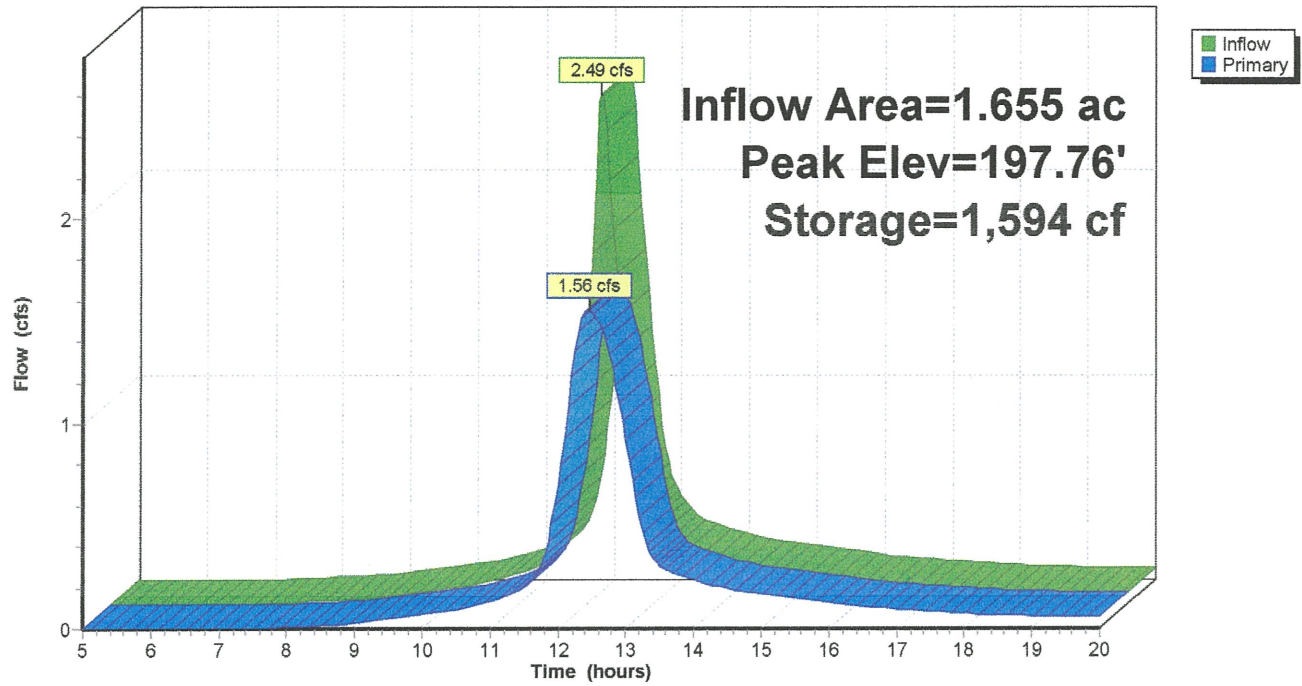
Device	Routing	Invert	Outlet Devices
#1	Primary	196.00'	12.0" x 10.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 195.80' S= 0.0200 '/' Cc= 0.900 n= 0.012
#2	Device 1	196.00'	7.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	197.76'	0.75' W x 0.50' H Vert. Orifice/Grate C= 0.600
#4	Device 1	198.49'	1.00' W x 0.25' H Vert. Orifice/Grate C= 0.600
#5	Primary	199.20'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.56 cfs @ 12.47 hrs HW=197.76' (Free Discharge)

- 1=Culvert (Passes 1.56 cfs of 4.24 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.56 cfs @ 5.83 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Orifice/Grate (Controls 0.00 cfs)
- 5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Pond 1

Hydrograph



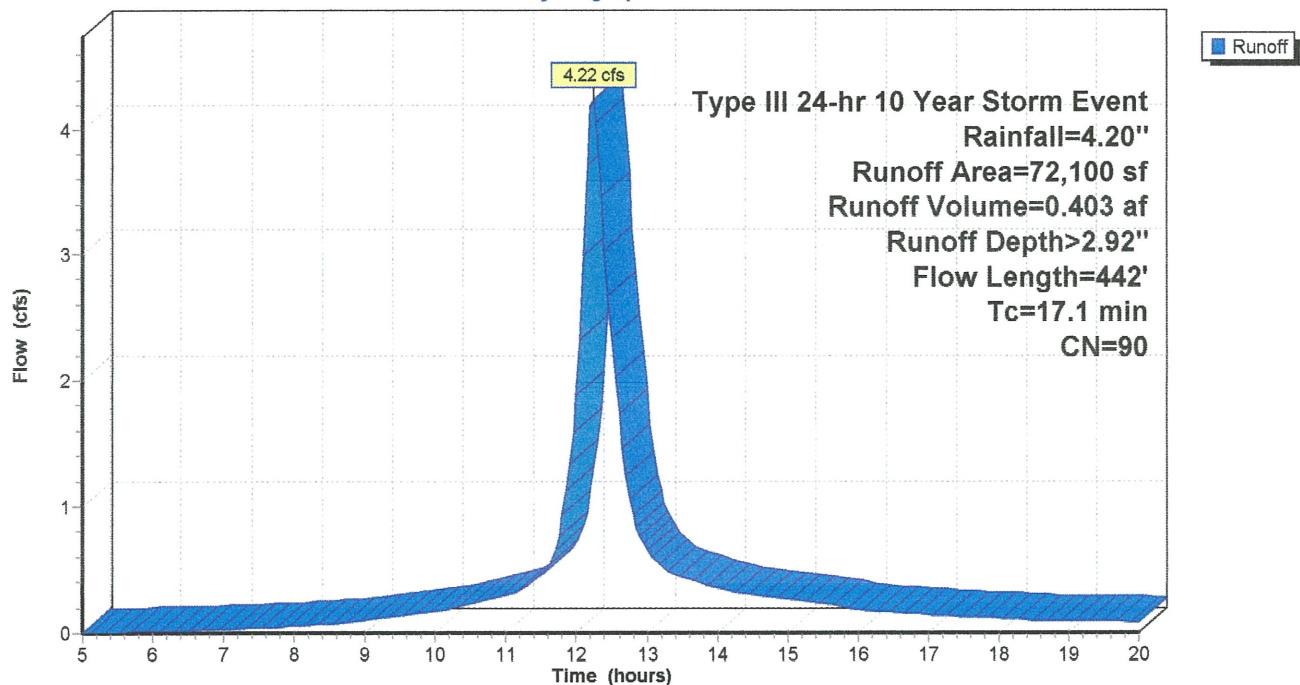
Summary for Subcatchment 3S: Proposed Region 1

Runoff = 4.22 cfs @ 12.23 hrs, Volume= 0.403 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Event Rainfall=4.20"

Area (sf)	CN	Description
35,850	98	Paved parking & roofs
19,020	83	Woods, Poor, HSG D
17,230	80	>75% Grass cover, Good, HSG D
72,100	90	Weighted Average
36,250		Pervious Area
35,850		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
0.4	30	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	312	0.0110	7.42	178.05	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=2.00' Z= 5.0 '/' Top.W=22.00' n= 0.022 Earth, clean & straight
17.1	442	Total			

Subcatchment 3S: Proposed Region 1**Hydrograph**

Summary for Reach 4R: Design Point

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 2.91" for 10 Year Storm Event event
Inflow = 3.14 cfs @ 12.39 hrs, Volume= 0.401 af
Outflow = 3.14 cfs @ 12.39 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.98 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.14 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 12.39 hrs, Average Depth at Peak Storage= 0.16'

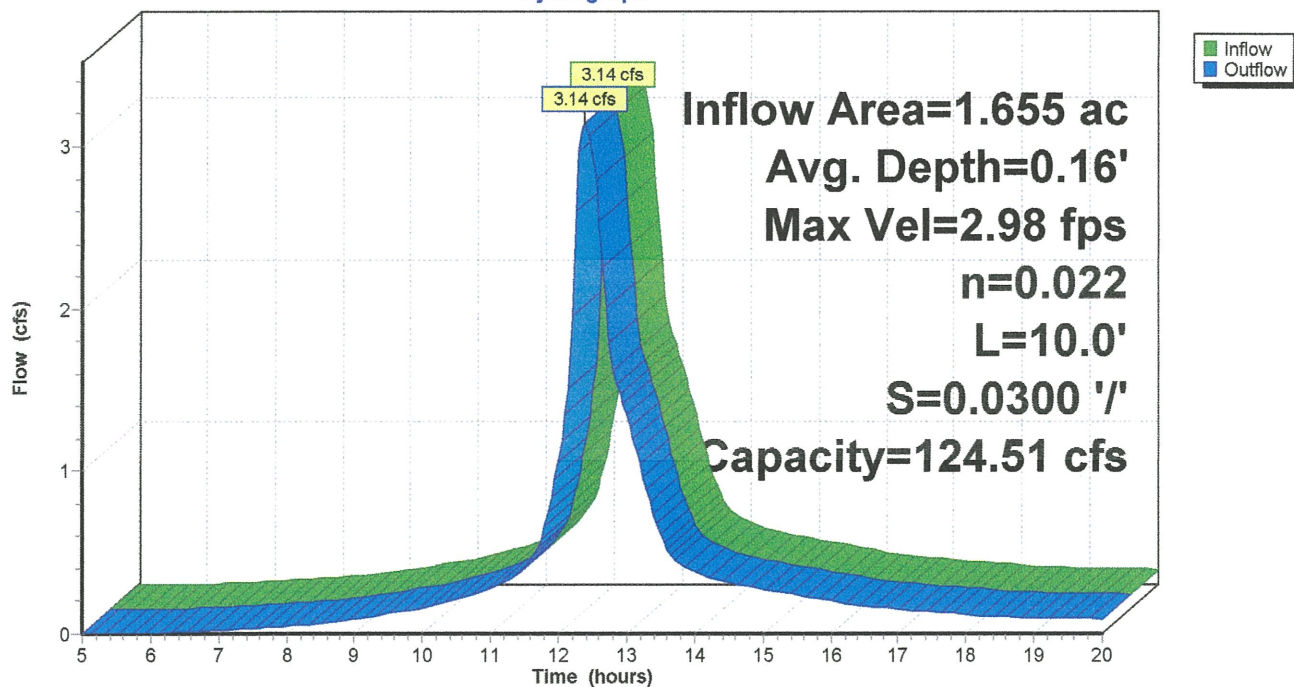
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

**Reach 4R: Design Point****Hydrograph**

Summary for Pond 5P: Pond 1

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 2.92" for 10 Year Storm Event event
 Inflow = 4.22 cfs @ 12.23 hrs, Volume= 0.403 af
 Outflow = 3.14 cfs @ 12.39 hrs, Volume= 0.401 af, Atten= 26%, Lag= 9.7 min
 Primary = 3.14 cfs @ 12.39 hrs, Volume= 0.401 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.49' @ 12.39 hrs Surf.Area= 1,543 sf Storage= 2,608 cf

Plug-Flow detention time= 13.7 min calculated for 0.401 af (99% of inflow)
 Center-of-Mass det. time= 11.3 min (786.1 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	196.00'	5,432 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
196.00	574	0	0
198.00	1,330	1,904	1,904
200.00	2,198	3,528	5,432

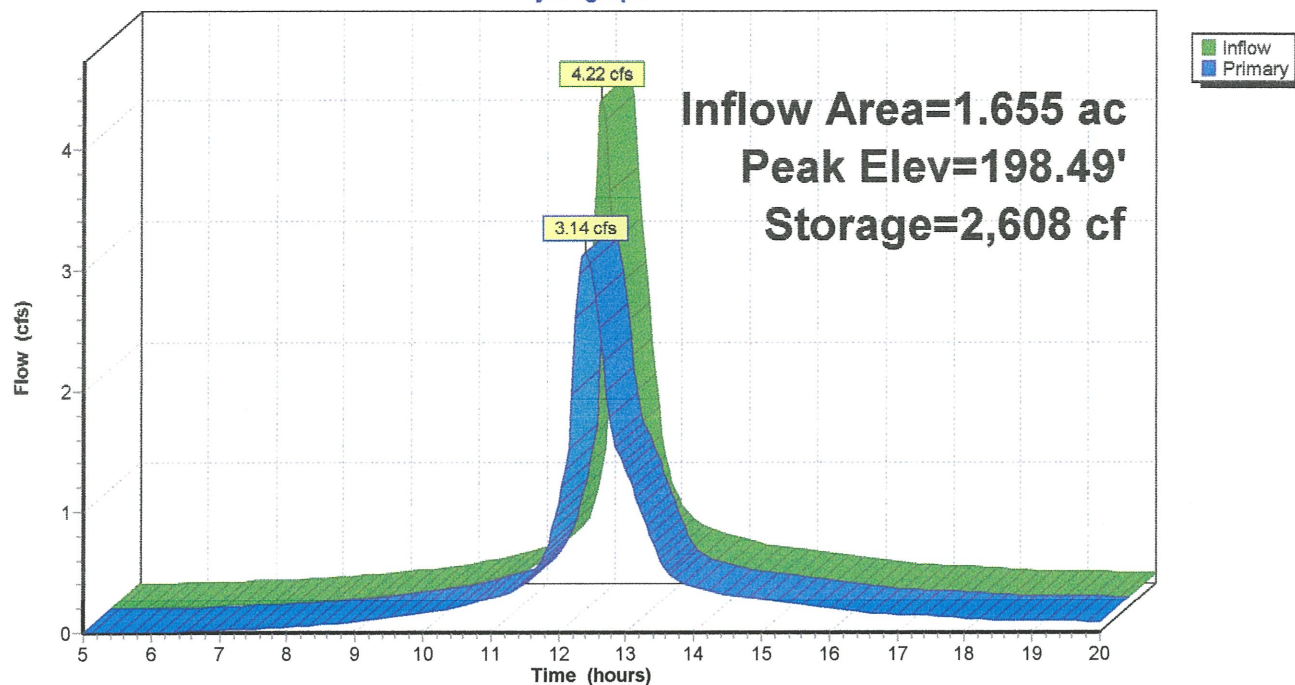
Device	Routing	Invert	Outlet Devices
#1	Primary	196.00'	12.0" x 10.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 195.80' S= 0.0200 '/' Cc= 0.900 n= 0.012
#2	Device 1	196.00'	7.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	197.76'	0.75' W x 0.50' H Vert. Orifice/Grate C= 0.600
#4	Device 1	198.49'	1.00' W x 0.25' H Vert. Orifice/Grate C= 0.600
#5	Primary	199.20'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=3.14 cfs @ 12.39 hrs HW=198.49' (Free Discharge)

1=Culvert (Passes 3.14 cfs of 5.33 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 1.91 cfs @ 7.13 fps)
 3=Orifice/Grate (Orifice Controls 1.23 cfs @ 3.28 fps)
 4=Orifice/Grate (Controls 0.00 cfs)
 5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Pond 1

Hydrograph



Summary for Subcatchment 3S: Proposed Region 1

Runoff = 5.46 cfs @ 12.23 hrs, Volume= 0.529 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

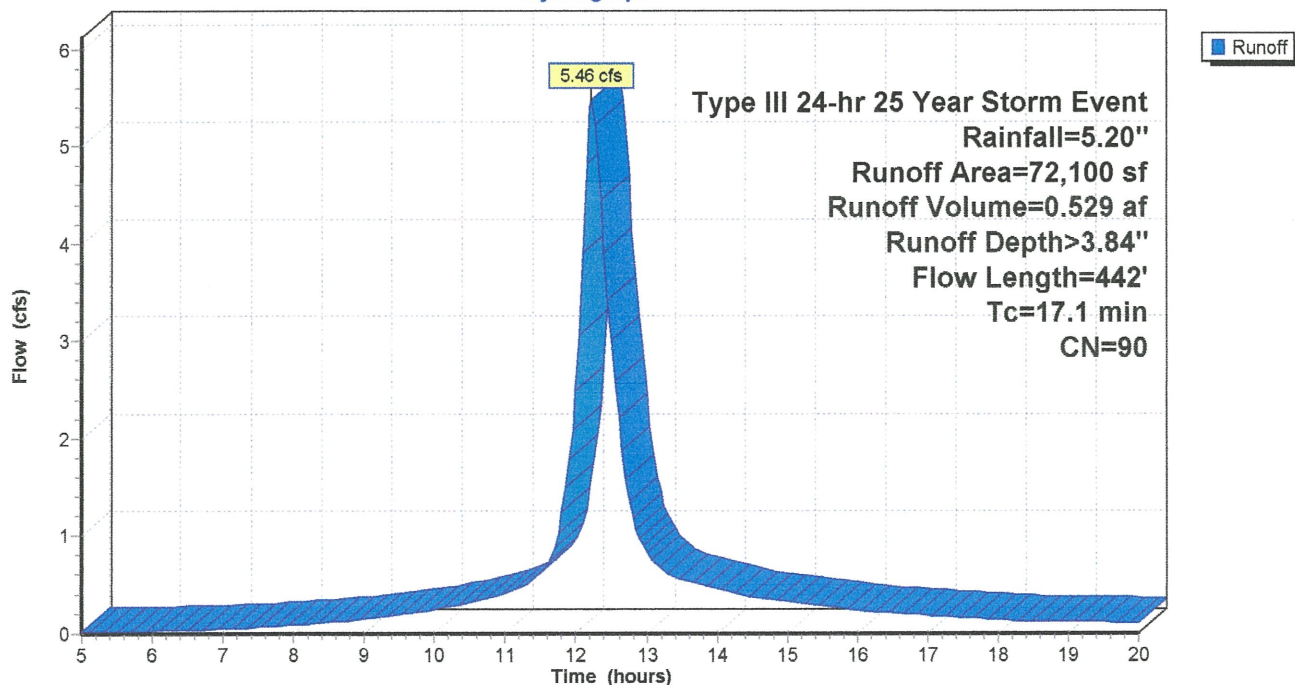
Type III 24-hr 25 Year Storm Event Rainfall=5.20"

Area (sf)	CN	Description
35,850	98	Paved parking & roofs
19,020	83	Woods, Poor, HSG D
17,230	80	>75% Grass cover, Good, HSG D
72,100	90	Weighted Average
36,250		Pervious Area
35,850		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.0	100	0.0600	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.40"
0.4	30	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	312	0.0110	7.42	178.05	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=2.00' Z= 5.0 '/' Top.W=22.00' n= 0.022 Earth, clean & straight
17.1	442	Total			

Subcatchment 3S: Proposed Region 1

Hydrograph



Summary for Reach 4R: Design Point

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 3.82" for 25 Year Storm Event event

Inflow = 4.33 cfs @ 12.36 hrs, Volume= 0.526 af

Outflow = 4.32 cfs @ 12.37 hrs, Volume= 0.526 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.29 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 1.25 fps, Avg. Travel Time= 0.1 min

Peak Storage= 13 cf @ 12.37 hrs, Average Depth at Peak Storage= 0.19'

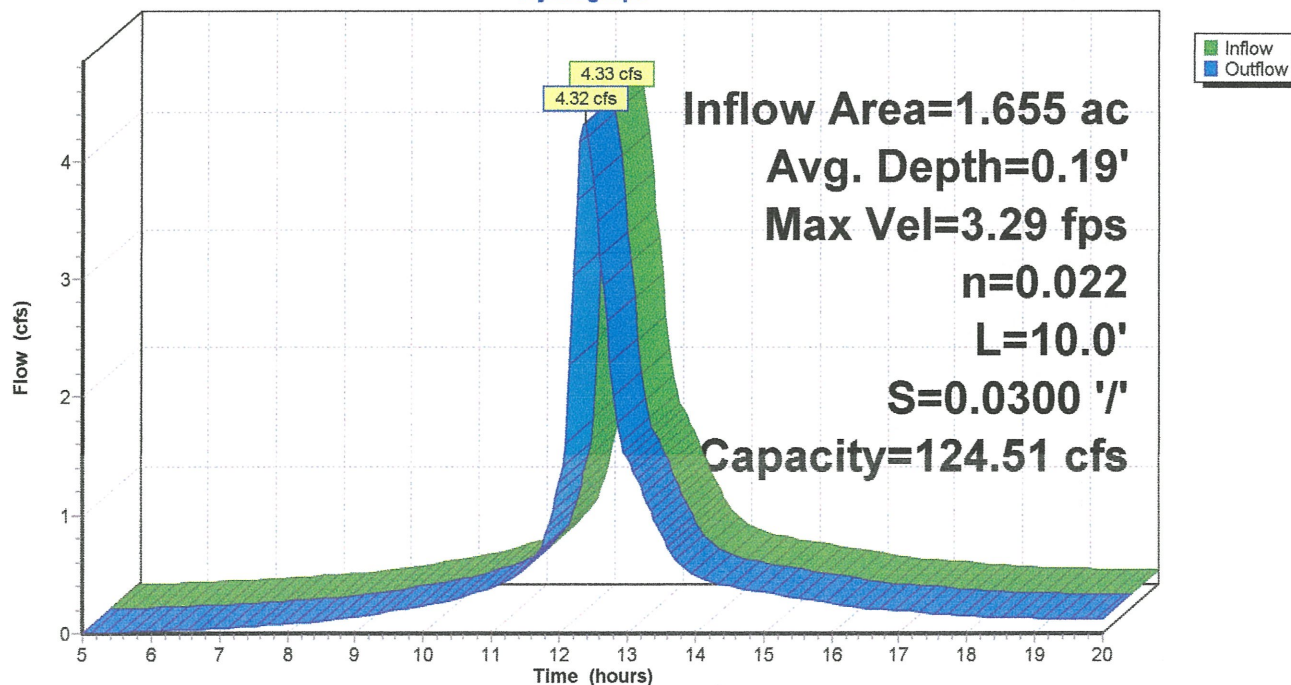
Bank-Full Depth= 1.00', Capacity at Bank-Full= 124.51 cfs

5.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 10.0 '/' Top Width= 25.00'

Length= 10.0' Slope= 0.0300 '/'

Inlet Invert= 0.00', Outlet Invert= -0.30'

**Reach 4R: Design Point****Hydrograph**

Summary for Pond 5P: Pond 1

Inflow Area = 1.655 ac, 49.72% Impervious, Inflow Depth > 3.84" for 25 Year Storm Event event
 Inflow = 5.46 cfs @ 12.23 hrs, Volume= 0.529 af
 Outflow = 4.33 cfs @ 12.36 hrs, Volume= 0.526 af, Atten= 21%, Lag= 8.3 min
 Primary = 4.33 cfs @ 12.36 hrs, Volume= 0.526 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.87' @ 12.36 hrs Surf.Area= 1,706 sf Storage= 3,219 cf

Plug-Flow detention time= 13.1 min calculated for 0.526 af (99% of inflow)
 Center-of-Mass det. time= 11.0 min (779.6 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	196.00'	5,432 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
196.00	574	0	0
198.00	1,330	1,904	1,904
200.00	2,198	3,528	5,432

Device	Routing	Invert	Outlet Devices
#1	Primary	196.00'	12.0" x 10.0' long Culvert CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 195.80' S= 0.0200 '/' Cc= 0.900 n= 0.012
#2	Device 1	196.00'	7.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	197.76'	0.75' W x 0.50' H Vert. Orifice/Grate C= 0.600
#4	Device 1	198.49'	1.00' W x 0.25' H Vert. Orifice/Grate C= 0.600
#5	Primary	199.20'	6.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=4.31 cfs @ 12.36 hrs HW=198.86' (Free Discharge)

- 1=Culvert (Passes 4.31 cfs of 5.81 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 2.06 cfs @ 7.72 fps)
- 3=Orifice/Grate (Orifice Controls 1.66 cfs @ 4.42 fps)
- 4=Orifice/Grate (Orifice Controls 0.59 cfs @ 2.35 fps)
- 5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Pond 1

Hydrograph

